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Docket No. 1163-0214P Application No. 09/210,775

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PATENT
1163-0214P

IN THE U.S. PATENT AND TRADEMARK OFFICE

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In re application of		Before the Board of Appeals	
SHIMADA, et al.		Appeal No.:	
Appl. No.:	09/210,775	Group:	2613
Filed:	December 14, 1998	Examiner:	Allen C. Wong
For:	MOVING PICTURE ENCODING SYSTEM		

BRIEF FOR APPELLANT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

November 21 2003

Sir:

This appeal is from the decision of the Examiner dated December 13, 2002, finally rejecting claims 1-14, which are reproduced as an Appendix to this Brief. This Brief if being filed in triplicate with the requisite fee.

The commissioner is hereby authorized to charge any appropriate fees under 37 C.F.R. §§1.16, 1.17 and 1.21 that may be required by this paper, and to credit any overpayment, to deposit account 02-2448.

I. Real Party in Interest

The named inventors have assigned their rights to the invention that is disclosed in the application and any patent that may issue therefrom to Mitsubishi Denki Kabushiki Kaisha, as recorded in the Patent and Trademark Office at Reel 9669, Frame 0046.

II. Related Appeals and Interferences

To the best of the knowledge of the undersigned, there are no other appeals or interferences known to the Appellants, the Appellants' representatives, or the above noted assignee that will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

III. Status of the Claims

Claims 1-14 are currently pending in the application. Claims 1-14 are rejected and the subject of the appeal. Claim 1 is the sole independent claim.

IV. Status of Amendments

There were no amendments filed subsequent to the final rejection.

V. Summary of the Invention

The present invention relates to encoding moving pictures. In the standard encoding system, MPEG-2, encoding of a picture is based upon the picture type. Generally, there are three types of pictures, an I-picture, P-picture and a B-picture. An I-picture is an intra-coded picture that uses information only from the particular frame of the picture in encoding. A P-picture is a picture that is encoded using a past frame. A B-picture is a picture that is encoded using a past frame or forward frame or both. When encoding, various amounts of codes are generated depending on the type of picture and the desired quality of the encoded picture. As picture quality increases the amount of codes can be very large reducing the overall efficiency of the system.

The present invention relates to an encoding system that can control both picture quality and the amount of codes generated by controlling the quantiser step size (15) associated with the encoded picture. In one embodiment this is achieved by a moving picture encoding system (Fig. 1) that encodes each picture included in a sequence of moving pictures (1) in groups of units (GOP) which include a plurality of pictures. See Page 16.

The system includes an encoding controller (14) that is used when a unit group includes a plurality of different types of pictures (I, B, P), as discussed above, which are to be encoded with different encoding methods. See page 16, line 16 through page 17, line 18. The encoding control means sets a target

quantizer step size (15) used to encode each of the different types of pictures included in the unit group. The encoding controller also performs a control operation to generate and furnish a quantizer step size so that a ratio among the target quantizer step sizes set for the different picture types is a predetermined value. See page 17, line 18 through page 18, line 17 and page 20, lines 10-21.

The control operation is determined in accordance with a feature of the sequence of moving pictures to be encoded which represents a degree of complexity of the sequence of moving pictures to be encoded. See Page 17 lines 1-17. An encoder (6) is also provided for encoding each picture included in the sequence of moving pictures using the quantizer step size furnished by the encoding control controller and using either each picture or the prediction from a past intra-coded image and/or a predictive coded picture. See page 18, lines 18 through page 19 line 30 and see page 21, lines 7-27.

In this manner, the amount of codes generated during the encoding operation of each of the plurality of pictures in a group of pictures can be controlled, while maintaining the relative picture quality among the plurality of adjacent pictures in terms of time.

VI. The Issues

The final Office Action presents one issue for review on Appeal.

1. Whether claims 1-14 are properly rejected under 35 U.S.C. § 103(a) as being unpatentable over Odaka (U.S. Patent No. 5,317,397) in view of Lee (U.S. Patent No. 5,592,226).

VII. Grouping of the Claims

For purpose of this appeal, Appellants consider the claims to stand or fall together.

VIII. Argument

A. Claims 1-14 are not properly rejected under 35 U.S.C. § 103(a) in view of Okada and Lee.

To establish *prima facie* obviousness, all claim limitations must be taught or suggested by the prior art and the asserted modification or combination of prior art must be supported by some teaching, suggestion, or motivation in the applied reference or in knowledge generally available to one skilled in the art. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). Thus, "[a]ll words in a claim must be considered in judging the patentability of that claim against the prior art."

In re Wilson, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). The prior art must suggest the desirability of the modification in order to establish a *prima facie* case of obviousness. *In re Brouwer*, 77 F.3d 422, 425, 37 USPQ2d 1663, 1666 (Fed. Cir. 1995). It can also be said that the prior art must collectively suggest or point to the claimed invention to support a finding of obviousness. *In re Hedges*, 783 F.2d 1038, 1041, 228 USPQ 685, 687 (Fed. Cir. 1986); *In re Ehrreich*, 590 F.2d 902, 908-09, 200 USPQ 504, 510 (CCPA 1979).

1. <u>The References Fail to Teach all the Claimed Limitations</u>

Regarding claim 1, contrary to the teachings of the present invention that can control both the picture quality and the amount of codes generated, the Odaka et al. patent teaches that an allocation of the amount of codes is only performed in a predetermined constant manner. The Odaka et al. patent explicitly refers to three steps (col. 22, lines 51-57) that are performed for rate control, these being:

(1) allocating an amount of bits (a bit rate) to N pictures from the I picture to the B3 picture immediately before the next I picture;

(2) allocating and updating an amount of bits for each picture; and

(3) controlling the quantization step size in each picture by using a virtual buffer.

Therefore, the system of Odaka et al. can at best simply prevent an extreme variation of the picture quality. This is achieved by updating the allocation rate of the amount of codes in such a manner so as to set the relationship among the I, P and B pictures to a predetermined constant relationship. The system allocates the amount of codes based only on the global complexity measures (i.e., Xi, Xp and Xb). The primary function of the encoding control processes of Odaka's system is to allocate the target amount of codes to each of the three picture types based on the global complexity measure that is a product of the number of generated bits and the respective quantizer step size.

Unlike Odaka et al., the encoding control process defined in claim 1 is not totally dependent on the allocation of a target amount of codes based on the global complexity measure for each picture, but is controlled in accordance with features of the sequence of moving pictures. As outlined above, the purpose of the present invention is to provide an encoding system that can control both picture quality and the amount of codes generated. To achieve this, the quantizer step size is first set to each of a plurality of picture types (e.g., I, P, B). It is controlled thereafter so that a ratio among the target quantizer step sizes is set to a predetermined ratio in accordance with features of the sequence of moving pictures to be encoded. Thus, the amount of codes generated during the encoding operation of each of the plurality of pictures in a group of pictures

(GOP) can be controlled, while maintaining the relative picture quality among the plurality of adjacent pictures in terms of time.

Therefore, Odaka fails to teach or suggest, *inter alia,* encoding control means for, when said unit group includes a plurality of different types of pictures which are to be encoded with different encoding methods, setting a target quantizer step size used to encode each of the different types of pictures included in said unit group, and for performing a control operation to generate and furnish a quantizer step size so that a ratio among the target quantizer step sizes set for the different picture types is a predetermined one, said control operation not being totally depending on the allocation of quantity of the target amount of codes based on the global complexity measure for each of the picture, but in accordance with features of the sequence of moving pictures; and encoding means for encoding said each picture included in said sequence of moving pictures including said each picture using said quantizer step size furnished by said encoding control means and using either said each picture or prediction from a past intra-coded image and/or a predictive coded picture, as recited in claim 1.

As pertaining to Lee, the Examiner alleges in his response on page 2 of the Final Office Action that Lee teaches measurement between frames as a whole. However, the Examiner has failed to address the specific teachings of Lee. Specifically, Lee performs a comparison between the coding target frame f_c and

the immediate past frame f_{c-1} or between the current frame f_c and the last reference frame f_{ref}. Appellant respectfully submits that detection of the motion between the frames as a whole is not performed at all, in contrast to the present invention as recited in claim 1 in which the control operation is not totally dependent "on the allocation of quantity of the target amount of codes based on the global complexity measure for each of the picture" but is dependent on the allocation of quantity of the target amount of codes "in accordance with features of the sequence of moving pictures".

The Examiner apparently relies on the teaching of a Histogram of Difference (HOD) method discussed by Lee to "determine relative distances between frames" and "local motion in between frames" as applied to a group of frames. Specifically, the Examiner relies on Fig. 29 and column 21, lines 53+ of Lee, quotes of these portions follows:

> In FIG. 29, a composite of three curves shows a comparison between the TAMI and OSA embodiments of the invention relative to image movement. The uppermost curve 120 shows a plot of image movement versus frame number for a GOP of 15 frames. In this example, the image movement curve 122 shows a region 124 of "busy temporal activity" between frames 1 and 7, and a region 126 of "low temporal activity" 126 between frames 8 and 15. As shown, in region 124 P frames occur more frequently or are closer to one another in this region because there is more data change, that is there is greater image movement from one frame to another. Contrariwise, in region 126 where image movement is substantially less, the P frames occur less frequently, or are further apart from one another, because there is less data change or image movement from one frame to another. In the curve section 128, TAMI processing for coding frames is shown as a plot of frame distance, that is the global picture movement between frames relative to

frame number. The frame distance or movement at which a **Type 0 threshold** is detected is shown by the broken line 130. As shown, each time the frame distance or image movement between frames exceeds the **Type 0 threshold** 130, the immediately previous frame from the occurrence of the **Type 0 threshold** is designated as a P2 frame. ...

Another embodiment of the invention designated BSE-TAMI (Binary Search Equidistant TAMI will now be described. Assume N SSPs (scene segmentation points or Type 0 scene changes) are detected by the scene change detection algorithm 14 (see FIG. 4) using a constant threshold. Assume that the distance measure is an integer and, as a basis for developing a heuristic, is a monotonically increasing function with respect to the time separation between two frames. HOD (histogram of difference) is used in such a simulation to measure motion by distance measurements, because it generally tends to be monotonic.

The problem is to find nearly equidistant positions of SSPs or Type 0 scene changes. The present fast heuristic search is for positions that are close to the best positions. FIG. 30 is an example where two SSPs or Type 0 scene changes are detected by an SSP detector 14 using an initial threshold, .tau..sub.0, which produces N SSPs. Denote the distance between the last SSP and the end frame of a GOP by a (.tau.).

As clearly indicated in the above sections relied upon by the Examiner, the HOD is merely one tool used to determine a scene change such as determined by the Type 0 threshold and does not ptovide a control operation which is dependent on the allocation of quantity of the target amount of codes “in accordance with features of the sequence of moving pictures”, as recited in claim 1, which is inconsistent with Appellants’ position and is in direct contrast to the Examiner’s interpretation of this reference.

However, it is not necessary to rely on the Appellants' interpretation of the reference, for the Lee reference itself expressly discloses what is meant by the Type 0 threshold and its relationship to the coding target frame fc. The Type 0 threshold is a scene change threshold. This is clearly shown in Fig. 4 and described, for example, in column 10 lines 53 to column 11, line 11, which discloses the following (with emphasis added).

> Two types of scene detectors 12 and 14 are required for processing the algorithm, as shown. In FIG. 4, the first detector 12 declares a scene change of Type 1 for the current frame when the distance or relative movement measure between the current frame fc and the immediate past frame fc-1 is above a threshold T1 (step 103). This type of scene change corresponds to an actual scene content change; it is coded as an I2 frame (very coarsely quantized intra frame), and the immediate past frame fc-1 is coded in step 106 as a P2 frame (very coarsely quantized predicted frame). The I2 frame coding exploits the forward temporal masking effect, and the P2 frame coding takes advantage of the backward temporal masking effect.
>
> The second detector 14 detects scene changes of Type 0. This implements a temporal segmentation algorithm for processing. This algorithm, as shown in FIG. 4, declares the current frame fc as a scene change of Type 0, when the distance or relative movement measured between the current frame fc and the last reference frame fref is above a threshold T0 (see step 104). This time the immediate past frame fc-1 becomes a P1 frame which is a regular predicted frame. The bit allocation strategy for the temporal segmentation is that every end frame of temporal segments should become a P1 frame, and that the frames in between should be B1 or B2 frames depending on whether the extra P1 frame is being used or not.

As previously noted and expressly described by Lee in the above-referenced sections, the Lee process performs a comparison between the coding target

frame fc and the immediate past frame fc-1 or between the current frame fc and the last reference frame f_{ref}.

Referring to Figs. 4 and 10 of Lee, after a delay of one GOP during encoding the first detector 12 declares a scene change of Type 1 for the current frame when the distance or relative movement measurement between the current frame fc and the immediate past frame fc-1 is above a threshold T1, as shown in step 103 of Fig. 4 and 10. This type of scene change corresponds to the actual scene content change wherein fc is coded as an I2 frame (a very coarsely quantized intra frame) and the immediate past frame fc-1 is coded, in step 106, as a P2 frame (a very coarsely quantized predicted frame).

Alternatively, Lee's second detector 14 declares the current frame fc as a scheme change of Type 0, when the distance or relative movement measurement between the current frame and the last reference frame fref is above a threshold T0 as shown in step 104 of Fig. 4 and 10. However, this time the immediate past frame becomes a P1 frame that has the properties of a regular predicted frame (column 10, line 53 to column 11, line 11). Further, in the case where neither the condition of step 103 or step 104 is satisfied, the next frame is checked.

The above-described process performs a comparison between the coding target frame fc and the immediate past frame fc-1 or between the current frame fc and the last reference frame fref. However, the detection of the motion

between the frames as a whole is not performed at all as recited by the control operation being dependent on the allocation of quantity of the target amount of codes "in accordance with features of the sequence of moving pictures" in claim 1.

Furthermore, the Lee reference discloses that it relies on special frame types (a total of 6) and its special "TAMI" algorithm to accomplish the above-described processes, as noted in column 9, lines 44-45.

Accordingly, when properly interpreted in light of the teachings of Lee, the sections of Lee relied upon by the Examiner directly support Appellants' position that the Type 0 threshold used in Fig. 29 is clearly just a scene change threshold and does not detect the motion between the frames as a whole.

Thus, Lee fails to teach or suggest, *inter alia*, encoding control means for, when said unit group includes a plurality of different types of pictures which are to be encoded with different encoding methods, setting a target quantizer step size used to encode each of the different types of pictures included in said unit group, and for performing a control operation to generate and furnish a quantizer step size so that a ratio among the target quantizer step sizes set for the different picture types is a predetermined one, **said control operation not being totally depending on the allocation of quantity of the target amount of codes based on the global complexity measure for each of the picture,**

but in accordance with features of the sequence of moving pictures, as recited in claim 1. (emphasis added)

2. There is no Motivation to Combine the References

Further, the Examiner contends on page 3 of the outstanding Office Action that "Odaka and Lee can be cohesively applied together because they are analogous to one another because they are both in the same MPEG video encoding environment." Appellants respectfully submit that this is merely a conclusory statement and that a proper motivation and the ability to combine the patents is not provided by the Examiner. Appellants respectfully submit that whether or not the patents are analogous art is not conclusive evidence that the patents are combinable as suggested by the Examiner.

As stated in MPEP § 2143.01, if the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims prima facie obvious. *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959). The Examiner has failed to address the merits of this requirement and instead has merely relied on a conclusory statement that the references can be combined because they relate to an MPEG video encoding environment.

Stated more simply, the Examiner has failed to address why one of ordinary skill in the art would partially replace the algorithm taught in Odaka that utilizes spatial temporal filtering to achieve a prediction signal used in coding a picture with the algorithm taught by Lee that determines the designation of frames as either I, P or B and the spacing between reference frames and the number of bits used for each frame.

As previously noted, the Odaka patent explicitly refers to three steps (col. 22, lines 51-57) that are performed for rate control as:

(1) allocating an amount of bits (a bit rate) to N pictures from the picture to the B3 picture immediately before the next I picture;

(2) allocating and updating an amount of bits for each picture; and

(3) controlling the quantization step size in each picture by using a virtual buffer.

Therefore, the Odaka patent achieves this by updating the allocation rate of the amount of codes in such a manner so as to set the relationship among the I, P and B pictures to a predetermined constant relationship. The primary function of the encoding control processes of the Odaka system is to allocate the target amount of codes to each of the three picture types based on the global complexity measure that is a product of the number of generated bits and the respective quantizer step size.

In contrast to this "principle of operation" of the Odaka patent, the Lee patent relies on a custom set of frame definitions (i.e., six different frame Types, I1, I2, P1, P2, B1, and B2 are used). This in and of itself destroys the combinability of Odaka and Lee as alleged by the Examiner, because it would require that Odaka adopt the unconventional bit allocations of the additional frames which would destroy the predetermined constant relationship between the conventional I, P and B frames.

Still further, in direct opposition to the predetermined constant relationship taught by Odaka, Lee explicitly teaches to vary the bit relationships and even control the bit rate by controlling the type of frames used, such as describe in column 3 lines 1-13, as follows.

> When the system is used with a transmission channel such as used in digital television, the bit rate may be controlled by loading the processed bits into a buffer and controlling the number of levels used in the quantizer so as to keep a given number of bits in the buffer. In the event that two or more successive frames have global motion in excess of T0 so that the frames just prior to them are designated as good resolution P1 frames, it is possible that controlling the bit rate may cause a second P1 frame to be processed with fewer bits than desired. In such a case, only the first P1 frame is processed, and the frames between it and the next reference frames are processed as B1 frames even though they may qualify as P1 frames, in another embodiment of the invention.

Clearly, this type of operation of Lee is in direct opposition to the principles of the Odaka patent.

Appellants maintain that the Examiner has failed to address these deficiencies. Further, the general allegation on page 6 of the outstanding Office

Action, that taken as a whole the references suggest the claimed invention and one would be motivated to modify the references as suggested so as to accurately, effectively and efficiently encode the sequence of moving pictures, does not provide any teaching or suggestion in the prior art references. Accordingly, Appellants respectfully submit that even taken as a "whole" the teachings of these references are not sufficient to render the claims prima facie obvious, even if the alleged combination did yield Appellants' claimed combinations, which it does not. Obviousness cannot be established by hindsight combination to produce the claimed invention. *In re Gorman*, 933 F.2d 982, 986, 18 USPQ2d 1885, 1888 (Fed.Cir.1991). It is the prior art itself, and not the appellants' achievement, that must establish the obviousness of the combination. Therefore, Appellants submit that the only motivation to make such modifications to Odaka and Lee is based on an impermissible hindsight reference to Appellants' specification.

IX. Conclusion

Based on the reasons set forth above, the rejections of claims 1-14 under 35 U.S.C. §103 should be REVERSED. As shown in the foregoing arguments, the claimed features of the present invention are not disclosed or suggested in the cited documents. Further, one of ordinary skill in the art would not look to combine the teachings of the references. Accordingly, reversal of the rejection is respectfully requested.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. 1.16 or under 37 C.F.R. 1.17; particularly, extension of time fees.

Respectfully submitted,

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Claims For Appeal

Claim 1. A moving picture encoding system for encoding each picture included in a sequence of moving pictures in units of a unit group comprised of a plurality of pictures including said each picture, said system comprising:

encoding control means for, when said unit group includes a plurality of different types of pictures which are to be encoded with different encoding methods, setting a target quantizer step size used to encode each of the different types of pictures included in said unit group, and for performing a control operation to generate and furnish a quantizer step size so that a ratio among the target quantizer step sizes set for the different picture types is a predetermined one, said control operation not being totally depending on the allocation of quantity of the target amount of codes based on the global complexity measure for each of the picture, but in accordance with features of the sequence of moving pictures; and

encoding means for encoding said each picture included in said sequence of moving pictures including said each picture using said quantizer step size furnished by said encoding control means and using either said each picture or prediction from a past intra-coded image and/or a predictive coded picture.

Claim 2. The moving picture encoding system according to claim 1, wherein said encoding control means initially sets the quantizer step size for a

macroblock to be encoded first in said each picture currently being encoded to the target quantizer step size set for the picture type of said each picture currently being encoded, and then, each time it encodes each of macroblocks remaining in said each picture currently being encoded, updates the quantizer step size initially set for the first macroblock so that the average of the quantizer step sizes used during the encoding of all macroblocks in said each picture finally approaches the target quantizer step size set for the picture type of said each picture currently being encoded.

Claim 3. The moving picture encoding system according to Claim 1, wherein said encoding control means further extracts the feature of said sequence of moving pictures to be encoded which represents a degree of complexity of said sequence of moving pictures to be encoded, and wherein said encoding control means adaptively updates said ratio among the target step sizes set for the different types of pictures according to said extracted feature of said sequence of moving pictures.

Claim 4. The moving picture encoding system according to Claim 2, wherein said encoding control means further extracts the feature of said sequence of moving pictures to be encoded which represents a degree of complexity of said sequence of moving pictures to be encoded, and wherein

said encoding control means adaptively updates said ratio among the target step sizes set for the different types of pictures according to said extracted feature of said sequence of moving pictures.

Claim 5. The moving picture encoding system according to Claim 1, wherein said encoding control means determines whether an amount of codes to be generated when encoding said each picture in the unit group will deviate by a predetermined range or even more from a target amount of generated codes for said each picture if the encoding is carried out using the target quantizer step sizes set for the plurality of picture types, and wherein, if said encoding control means determines that such a deviation from the target amount of generated codes will occur, said encoding control means updates the target quantizer step sizes set for the different types of pictures.

Claim 6. The moving picture encoding system according to Claim 2, wherein said encoding control means determines whether an amount of codes to be generated when encoding said each picture in the unit group will deviate by a predetermined range or even more from a target amount of generated codes for said each picture if the encoding is carried out using the target quantizer step sizes set for the plurality of picture types, and wherein, if said encoding control means determines that 'such a deviation from the target

amount of generated codes will occur, said encoding control means updates the target quantizer step sizes set for the different types of pictures.

Claim 7. The moving picture encoding system according to Claim 1, wherein said encoding control means further extracts the feature of said sequence of moving pictures to be encoded which represents a degree of complexity of said sequence of moving pictures to be encoded, and determines whether a scene change has occurred during the encoding of said each picture included in said unit group, and wherein, if said encoding control means determines that a scene change has occurred during the encoding of said each picture, it updates said ratio among the target quantizer step sizes set for the different types of pictures and their values according to the extracted feature of said sequence of moving pictures.

Claim 8. The moving picture encoding system according to Claim 2, wherein said encoding control means further extracts the feature of said sequence of moving pictures to be encoded which represents a degree of complexity of said sequence of moving pictures to be encoded, and determines whether a scene change has occurred during the encoding of said each picture included in said unit group, and wherein, if said encoding control means determines that a scene change has occurred during the encoding of said each

picture, it updates said ratio among the target quantizer step sizes set for the different types of pictures and their values according to the extracted feature of said sequence of moving pictures.

Claim 9. The moving picture encoding system according to Claim 1, wherein said encoding control means determines whether a scene change has occurred during the encoding of said each picture included in said unit group, and wherein, if said encoding control means determines that a scene change has occurred during the encoding of said each picture, it adaptively changes the type of the current picture currently being encoded in which the scene change occurs and also updates said ratio among the target quantizer step sizes for the different types of pictures and their values.

Claim 10. The moving picture encoding system according to Claim 2, wherein said encoding control means determines whether a scene change has occurred during the encoding of said each picture included in said unit group, and wherein, if said encoding control means determines that a scene change has occurred during the encoding of said each picture, it adaptively changes the type of the current picture currently being encoded in which the scene change occurs and also updates said ratio among the target quantizer step sizes for the different types of pictures and their values.

Claim 11. A moving picture encoding system according to Claim 1, wherein said encoding control means only uses an amount of-generated-codes-versus-quantizer-step-size characteristic of pictures of a certain type in order to set the target quantizer step sizes used to encode the different types of pictures which are to be encoded with the different encoding methods.

Claim 12. The moving picture encoding system according to Claim 2, wherein said encoding control means only uses an amount-of-generated-codes-versus-quantizer-step-size characteristic of pictures of a certain type in order to set the target quantizer step sizes used to encode the different types of pictures which are to be encoded with the different encoding methods.

Claim 13. The moving picture encoding system according to Claim 1, wherein when said unit group includes a picture to be intra-coded or an I-picture, a picture to be predictive-coded or a P-picture, and a picture to be bidirectionally –predictive-coded or a B-picture, said encoding control means extracts the feature of said sequence of moving pictures which represents a degree of complexity of said sequence of moving pictures to be encoded, and wherein if the extracted feature of said sequence of moving pictures indicates that the amount of motion between pictures is relatively small, said encoding

control means sets the amounts of generated codes assigned to each I-picture, each P-picture, and each B-picture within said unit group so that the amount of generated codes assigned to each I-picture is the largest, the amount of generated codes assigned to each P-picture is the second-largest, and the amount of generated codes assigned to each B-picture is the smallest, and, as the amount of motion between pictures represented by the extracted feature increases, updates said ratio among the target quantizer step sizes for the different types of pictures so that the differences among the amount of generated codes assigned to each I-picture, each P-picture, and each B-picture are reduced.

Claim 14. The moving picture encoding system according to Claim 2, wherein when said unit group includes a picture to be intra-coded or an I-picture, a picture to be predictive-coded or a P-picture, and a picture to be bidirectionally- predictive-coded or a B-picture, said encoding control means extracts the feature of said sequence of moving pictures which represents a degree of complexity of said sequence of moving pictures to be encoded, and wherein if the extracted feature of said sequence of moving pictures indicates that the amount of motion between pictures is relatively small, said encoding control means sets target amounts of generated codes allocated to each I-picture, each P-picture, and each B-picture in said unit group so that the

target amount of generated codes allocated to each I-picture, is the largest, the target amount of generated codes allocated to each P-picture is the second-largest, and the target amount of generated codes allocated to each B-picture is the smallest, and, as the mount of motion between pictures represented by the extracted feature increases, updates said ratio among the target quantizer step sizes for the different types of pictures so that the differences among the target amounts of generated codes allocated to each I-picture, each P-picture, and each B-picture are reduced.